

Appl. No. 09/937,452
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Reply to Office Action of May 5, 2004

REMARKS

Claims 4-6, 19-39 and 41 have been canceled without prejudice, claims 1, 3, 8, 9, 40, 42, 44, 45, 47, and 49 have been amended. Applicants submit that the pending claims are supported by the specification. Claims 1-3, 7-18, 40 and 42-49 remain in this application.

Claims 1, 3, 8, 9, 40, 42, 44, 45, 47, and 49 have been amended to replace the phrase "at least one" with --one, or more than one--, or include this phrase for the purpose of clarity.

Claims 1 and 44 have also been amended to indicate that the additive of interest is present in the basal medium in an amount from about 50 to about 200 mg/L. Support for this amendment may be found in Examples 5 and 6 (page 48, middle of the page, page 50 middle of the page) and with reference to Figures 7 and 8. Furthermore, claims 1 and 44 have been amended to specify the additive of interest. Support for this amendment may be found on page 20, middle of the page, and claim 4. As a result of this amendment, claim 4 has been canceled.

Claims 49 has been amended to indicate that the additive of interest is selected from the group consisting of lithium, chromium, nickel, selenium, silicon, tin, and vanadium. Support for this amendment may be found on page 20, middle of the page, and claim 4.

For the reasons given below, Applicants submit that the amended claims are in condition for allowance and notification to that effect is earnestly solicited.

Petition for Extension of Time

It is noted that a one-month petition for extension of time is necessary to provide for the timeliness of the response. A request for such an extension is made extending the time for response from August 5, 2004 to September 5, 2004, which falls on a Sunday, extending the time for response to Monday, September 6, 2004, which is a federal holiday, extending the time for response to Tuesday, September 7, 2004.

Claim Rejections Under 35 U.S.C. § 112

Claims 1-4, 7-18, 40, 42, 43 and 49 are rejected under 35 U.S.C. 112, second paragraph as being indefinite due to the use of the term "basal medium". Examiner states that this term is not

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defined in the specification or claims. Applicant respectfully disagrees as this term is defined in the specification on page 21, last full paragraph to page 22, end of Table 1. Table 1 of the specification provides several examples of basal media that are well known in the art, for example Murashige & Skoog, and Gambourg media. It is submitted that one of skill in the art would readily know these media, as evidenced by the use of these media, and similar media (e.g. Linsmaier & Skoog) in the cited prior art (e.g. Stojakowska, Cellarova et al., and Dodds).

Removal of the rejection to claims 1, 44 and 49, and their associated dependant claims under 35 U.S.C. 112, second paragraph is respectfully requested.

Claim Rejections Under 35 U.S.C. § 102/103

Claim 47 is rejected under 35 U.S.C. Section 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. Section 103(a) as obvious over Cellarova et al.. examiner states that Cellarova grow plants in the presence of Ca and Zn, and that the levels of these additives would be elevated when compared to plants grown on a basal medium.

Cellarova, (last sentence of page 267) uses a basal medium containing macroelements and microelements according to Linsmaier and Skoog. The composition of the Linsmaier and Skoog medium is provided below (along with other media, Murashige & Skoog and Gamborg B5 -for comparison; source Plant Tissue Culture Network - <http://aggie-horticulture.tamu.edu/tisscult/database/media/index.html>):

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Linsmaier and Skoog (1965) medium**Macronutrients (mg/l)**

Ammonium nitrate (NH_4NO_3) 1,650mg/l
Calcium chloride ($\text{CaCl}_2 \cdot \text{H}_2\text{O}$) 440mg/l
Magnesium sulfate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) 370mg/l
Potassium nitrate (KNO_3) 1,900mg/l
Potassium phosphate (KH_2PO_4) 170mg/l

Micronutrients (mg/l)

Boric Acid (H_3BO_3) 6.2mg/l
Cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) 0.025mg/l
Cupric Sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) 0.025mg/l
Ferrous sulfate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) 27.8mg/l
Manganese sulfate ($\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$) 22.3mg/l
Potassium Iodine (KI) 0.83mg/l
Sodium molybdate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$) 0.25mg/l
Zinc Sulfate ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$) 8.6mg/l
Na₂EDTA 37.3mg/l

Murashige & Skoog (1962) medium**Macronutrients (mg/l)**

Ammonium nitrate (NH_4NO_3) 1,650mg/l
Calcium chloride ($\text{CaCl}_2 \cdot \text{H}_2\text{O}$) 440mg/l
Magnesium sulfate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) 370mg/l
Potassium phosphate (KH_2PO_4) 170mg/l
Potassium nitrate (KNO_3) 1,900mg/l

Micronutrients (mg/l)

Boric Acid (H_3BO_3) 6.2mg/l
Cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) 0.025mg/l
Cupric Sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) 0.025mg/l
Ferrous sulfate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) 27.8mg/l
Manganese sulfate ($\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$) 22.3mg/l
Potassium Iodine (KI) 0.83mg/l
Sodium molybdate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$) 0.25mg/l
Zinc Sulfate ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$)^c 8.6mg/l
Na₂EDTA^a $\cdot 2\text{H}_2\text{O}$ ^a 37.2mg

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Gambourg B5 (1976)

Macronutrients (mg/l)

Ammonium sulfate ($(\text{NH}_4)_2\text{SO}_4$) 134mg/l
 Calcium chloride ($\text{CaCl}_2 \cdot \text{H}_2\text{O}$) 150mg/l
 Magnesium sulfate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) 246mg/l^a
 Potassium nitrate (KNO_3) 2,528mg/l^b

Micronutrients (mg/l)

Boric Acid (H_3BO_3) 3.0mg/l
 Cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) 0.025mg/l
 Cupric Sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)^c 0.025mg/l
 Ferrous sulfate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$)^d 27.8mg/l
 Manganese sulfate,
 monohydrate ($\text{MnSO}_4 \cdot \text{H}_2\text{O}$) 10mg/l
 Potassium Iodine (KI) 0.75mg/l
 Sodium molybdate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$) 0.25mg/l
 Sodium phosphate ($\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$) 150mg/l
 Zinc Sulfate ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$) 2.0mg/l
 Na₂EDTA $\cdot 2\text{H}_2\text{O}$ ^e 37.2mg/l^f

Claim 47 depends from claim 1, which has been amended to indicate that the basal medium is supplemented with from about 50 to about 200 mg/L of an additive of interest selected from the group consisting of a vitamin, boron, chromium, cobalt, copper, iron, lithium, iodine, manganese, molybdenum, nickel, selenium, silicon, tin, vanadium and zinc.

The elements lithium, chromium, nickel, selenium, silicon, tin, and vanadium, are listed in claim 1, but they are not present in the Linsmaier and Skoog (LS), Murashige & Skoog, or Gambourg media. Furthermore, of the micronutrients present in LS medium, and that are included in the list of additives in claim 1, these micronutrients are present at amounts (0.025 – 27.8 mg/L) well below the amounts that are used to supplement the media in the present invention (50-200mg/L).

Cellerova does not teach, or suggest, the supplementing of the basal medium with one or more additional additives of interest that are present from about 50 to about 200 mg/L in the basal medium and growing a plant on this medium. Applicant therefore submits that claim 47 is not

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disclosed or suggested by Cellarova, and removal of the rejection under 35 U.S.C. 102(b), and/or 35 U.S.C. Section 103(a) is requested.

Claim Rejections - 35 U.S.C. § 103

Claims 1-18, 40, and 42-48 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stojakowska et al., in view of Murthy et al., and further in view of Cellarova et al., and Dodds et al.. Applicant respectfully traverses the rejection.

Claims 1 and 44 define the additive of interest as being included in the basal medium at an amount from about 50 to about 200 mg/L. Furthermore, the additive of interest is defined as being selected from the group consisting of a vitamin, boron, chromium, cobalt, copper, iron, lithium, iodine, manganese, molybdenum, nickel, selenium, silicon, tin, vanadium and zinc.

Stojakowska et al., disclose the use of a Murashige and Skoog basal medium, Cellarova et al., the use of Linsmaier and Skoog basal medium, Dodds et al mention an MS medium, while Murthy et al. do not specifically disclose any basal medium. As noted above, lithium, chromium, nickel, selenium, silicon, tin, and vanadium, are not present in these basal media, for example Linsmaier and Skoog (LS), Murashige & Skoog, or Gambourg media. Furthermore, for the elements listed in claims 1 and 44, and that are also present in basal media, they are present in the basal media at a concentration well below that defined in claims 1 and 44.

Claim 49 has been amended to include chromium, nickel, selenium, silicon, tin, and vanadium, in addition to lithium. These elements are not present in basal media, and are therefore not suggested or disclosed in any of Stojakowska et al., Murthy et al., Cellarova et al., or Dodds et al.

There is no suggestion in any of the cited references to add from about 50 to about 200 mg/L elements to a basal medium and subculturing plantlets on the supplemented media as defined in claims 1 and 44. Removal of the rejection to claims 1-18, 40, and 42-48 under 35 U.S.C. 103(a) is respectfully requested.

It is respectfully submitted that the above-identified application is now in a condition for allowance and favorable reconsideration and prompt allowance of these claims are respectfully requested. Should the Examiner believe that anything further is desirable in order to place the

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application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,



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